Reconfigurable Security Sensor by CCD Camera

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Abstract: Nowadays-wide area surveillance systems are extensively employed for instant alarm on certain events, changes and for archiving the gained video material. However, specially trained personnel perform the alarming function (event detection), which naturally involves a variable number of subjective errors. If we set our aim to produce a multifunctional, programmable picture-creating device capable of alarming on certain events on one hand, and an autonomic, cheap system on the other hand, as a result we will get the device/process named in the title.

Keywords: automatic movement detecting, programmable sensibility, masking areas, distant reconfiguration, settable trigger position

1 The Comparison of the Traditional and the Proposed Novel Methods

In the suggested system a simple web-cam (CCD or CMOS) has to be linked to a micro-controller which has memory for archiving, a telemetric surface and of course an internal algorithm. The system incorporates an infra-light handling automatism for enhanced detection. The micro-controller loads the bit-stream arriving from the camera into the memory (RAM). Subsequently, the event detection is a matter

Figure 1
The proposed settable non-checking areas in a real image

Figure 2
The proposed settable non-checking areas of the windows and lighting units

of constant memory processing, whilst the latest stored data is compared to the newly arriving visual content. The event detection can be described as follows: if any change occurs in the memory, the visual content has changed accordingly.

$$S_D = S_{In}^{-D} \tag{1}$$

Where, S_D: the digitised pixel value, S_{in}: the input video-signal, D: deep of the digitised sample.
This method allows fine and precise definition of events both in time and area (Figure 1, 2) through programming. Seen from the possibility side the setting of options for time (speed) adjustment and fine-tuning can be an opportunity and

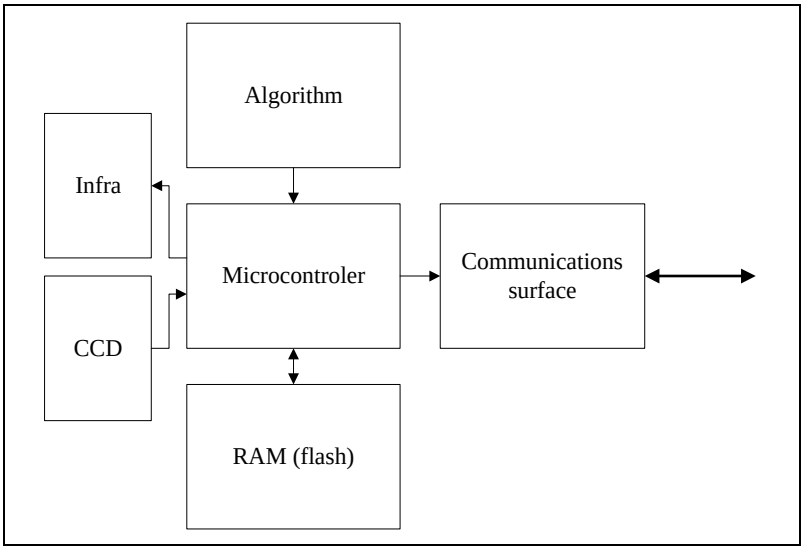

Figure 3
The Architect of the Sensor

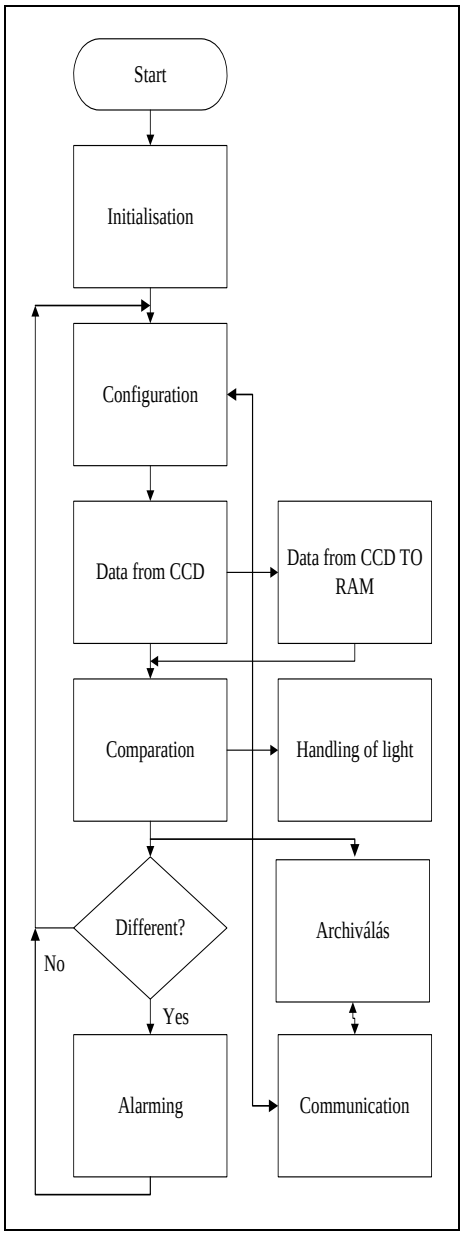

Figure 4
The proposed algorithm for the Sensor Firmware

necessity as well. It is important to make a distinction between certain events affecting the whole detection area (dusk, dawn, switch of artificial lighting) in order to be omitted as alarm triggering occurrences. It is also important to define parameters for time sensitivity for changing events (insect movement, clock hands moving) not to be taken in consideration.

2 Fast Digitising by the Slow Method

An analogue to the above mentioned is the opportunity of masking certain areas or setting different speed sensitivity parameters for them. This can be advantageous when dealing with irrelevant visual areas like traffic seen through the window, trees blown by wind, birds moving around, etc. Providing integrated archiving is very useful. With this method only data prior, simultaneous and posterior to the event should be archived for later processing. (Figure 3, 4) Initialisation through telemetrically methods is also an advantageous possibility. In this case the masked areas and/or characteristics are configured through a network instead of individual

computers. This method also allows dynamic reconfiguration giving the opportunity of setting sensor parameters according to daytime or special issues. (2) This abilities very useful because we can so memory efficient sample to archive accumulation.

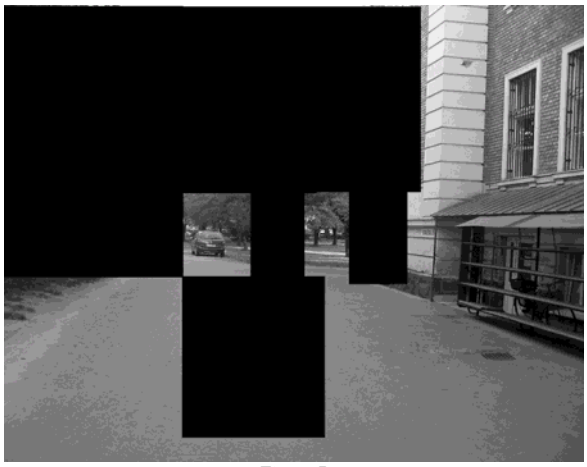

Figure 5
Inspection of outside area

$$A = g\left(S_{Da_n b_m} - S_{Da_n b_m}{}^{-1}\right) \tag{2}$$

Where, S_D: the digitised pixel value, S_D^{-1}: the Earlier pixel value, g: the granularity of different, A: alarm

$$S_D(t) = S_{In} D^{-n}\left(t_{ADC} + t_{\mu c} + t_p\right) \tag{3}$$

Where, t_{ADC}: the necessaries time for ADC, t_μ: the time of the authentic firmware lines, t_p: the time of the full picture

From the equation 3 we get the result of we can not use very quick ADC and micro-controller, because we get enough good result of the whole picture shifting the ADC cycle.

Conclusions

By the help of the shifting digitising process we can periodical relatively quick signal get a useful data-stream. The practical use of the suggested process is a security camera by the micro-controller. The uses of micro-controller get us a wide scale of the configuration and the telemetrically distant-command, and result from the inspection areas.

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